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BUMED NEWS LETTER

a digest of timely information

Editor - Captain F. W. Farrar. (MC). U.S.N.

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Circular Letters:

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Recurrent Cancer of the Colon and Rectum: Advances in the treatment of cancer of the colon and rectum consist largely of measures that have extended the amount of resection. In early lesions, such radical surgery offers the best assurance of cure. In advanced lesions, it permits the removal of growths that were formerly regarded as totally inoperable. Even when cancer recurs it can be removed by a second attempt at radical surgery. Once a properly executed resection has been done, however, there is a tendency for the surgeon to believe that the die has been cast. Because most recurrences are beyond the scope of surgery, all recurrences are apt to be considered hopeless and their removal is often regarded merely as a surgical feat without benefit for the patient. It is the purpose of this paper to point out that an attitude of pessimism is not justifiable.

It is considered that because surgery is the only way to treat cancer of the colon initially, it should be employed whenever possible in dealing with recurrences. If there is no positive evidence of distant metastases or generalized peritoneal seeding, reoperation should be considered regardless of the extent of the first operation, the histologic character of the growth, or the apparent fixation of the recurrence. Out of four illustrative case histories contained in the author's paper, two are presented here.

Case 2. E. K., a 58-year-old man, was admitted to the hospital because of anorexia and diarrhea of 6 weeks' duration, and pain in the right lower quadrant with swelling and tenderness of a 35-year-old appendectomy scar of 3 days' duration. There was a large abscess in the right lower quadrant, pointing in the appendectomy scar; its cause was not clear. Two weeks later a barium enema showed a large filling defect in the cecum. A right colectomy was performed with an end-to-side ileotransverse colostomy. The tumor had invaded the abdominal wall about the appendectomy scar. The entire thickness of the parietes was generously excised in this area. Convalescence was uneventful.

Pathological examination disclosed an adenocarcinoma that had extended through and beyond the bowel wall. The regional lymph nodes were extensively involved. Histologically, the tumor appeared to have been growing slowly.

The patient re-entered the hospital 2 and 1/2 years later, complaining of pain in the right flank, loss of weight, and a lump in the scar. Examination disclosed a large, ill defined mass that appeared to involve the abdominal wall. Some observers thought that it was a mass in the liver.

At operation a large mass involving the abdominal wall and round ligament of the liver was found. It was excised en bloc with the tissues of the abdominal wall. Convalescence was uneventful.

Pathological examination revealed a solid mass of adenocarcinoma; no lymph nodes were identified. Histologically, the tumor was observed to be invading tissue planes but appeared to be growing slowly.

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The patient was alive and well without evidence of recurrence 6 and 3/4 years after the second operation.

Case 3. D. R., a 52-year-old man, was admitted to the hospital in July, 1939, because of rectal bleeding, tenesmus, and loss of weight for 18 months. A large, fixed mass was palpable in the left lower quadrant. A barium enema showed a filling defect in the sigmoid, with direct extension to the bladder and terminal ileum. A right transverse colostomy and a side-tracking ileo-ileostomy were performed. Postoperatively, the patient developed a wound infection. Three weeks later resection of the sigmoid, terminal ileum and upper third of the bladder was performed. Convalescence was uneventful. The colostomy was closed 2 weeks later.

Pathological examination disclosed an adenocarcinoma which appeared to have been rapidly growing: there was local extension to the urinary bladder and ileum and many lymph-node metastases.

The patient re-entered the hospital 2 years later because of abdominal cramps and rectal bleeding. There was an ill defined mass low in the left lower quadrant. A barium enema showed evidence of pressure on the sigmoid. At operation a mass of solid tumor was found to involve the sigmoid, mesentery, bladder, left ureter, and retroperitoneal tissues; it was separated with difficulty from the iliac vessels. The ureter was resected, but because of lateral displacement, it was sufficiently long to permit an end-to-end anastomosis. A permanent colostomy was performed. The serosa over the posterior aspect of the bladder was removed with the tumor, but the bladder wall was not involved. Convalescence was uneventful.

Pathological examination revealed that the tumor was a mass of adenocarcinoma in fat that was involving the bowel wall. Histologically, it was extremely anaplastic, with many lymph-node metastases.

The patient was alive and well without evidence of recurrence 5 and 1/2 years after the second operation, and the function of the left kidney was normal.

By ordinary standards this was certainly an unfavorable case. The tumor was rapidly growing, the regional lymph nodes were extensively involved, and the original removal had to include portions of the bladder and ileum. Under such circumstances, the recurrence might well have been viewed as being beyond the scope of surgery. Yet, in retrospect, this has proved to be one of the most successful cases.

These cases were selected as examples of what may be accomplished by a second attempt at extirpation of carcinomas of the colon and rectum that have recurred locally. Obviously, if there are distant metastases or generalized peritoneal seeding, such surgery ought not to be attempted. The results in

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these cases, however, suggest that a tumor that recurs locally without distant metastases is peculiarly amenable to surgery if it can be completely eradicated.

A review of the histology of the tumors in the four cases presented by the author provided no clue to why distant metastases had not occurred. There were extensive local lymph-node metastases in Cases 1, 2, and 3, and there was evidence of blood-vessel invasion in Cases 1 and 4. Nor was the rate of growth of the tumor a reliable guide to prognosis in the individual case. None of the tumors was exceedingly anaplastic, but in Cases 1 and 3 there was moderately rapid growth. In Cases 2 and 4, the cancer was more slowly growing, but there was lymph-node involvement in Case 2, and blood-vessel invasion was present in Case 4. In the present state of knowledge the histologic character of the original growth seems to constitute no reason for withholding surgery if the tumor recurs.

The possible role of inflammation in limiting the distant spread of these tumors occasions comment, for, in Cases 1, 2, and 4 there were local abscesses in and around the growth, and in Case 3 the tumor was of an extremely inflammatory character. A study of the histology of the tumors, however, provided no evidence to support this notion. Whether or not an inflammatory reaction sealed off the lymphatic vessels at the base of the mesentery is a matter for future observation.

Conclusions. Recurrent cancer of the colon and rectum is not necessarily hopeless.

Tumors that grossly and histologically appear unfavorable may recur locally without distant metastases.

If there is no positive evidence of distant metastases or generalized peritoneal seeding, reoperation should be considered in the treatment of recurrent cancer of the colon, regardless of size and apparent fixation.

Gratifyingly long periods of arrest may follow such operations and a point to be stressed is that one must not too readily give up in dealing with cancer. (N. England J. Med., 24 July '47 - J. E. Dunphy)

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Relief of Episcleritis by Histamine Diphosphate: Immediate relief from the pain of episcleritis, far beyond that anticipated, was obtained by the trial of histamine diphosphate instilled directly into the eye as a counter-irritant. It had previously been used experimentally in the eye. It is now believed that the relief afforded is occasioned by the release of lateral pressure on pain fibers exerted by the sharply localized episcleric node. The fairly rapid subsidence of the episcleritis after treatment with histamine may be due to the increased availability of blood produced by the generalized conjunctival flush.

The pain of episcleritis can be relieved for a period of from 4 to 24 hours by the instillation of histamine diphosphate (1:1,000) in the conjunctival sac of

the involved eye. The relief occurs in from 12 to 45 seconds. The episcleric node loses its tenderness and may be freely palpated. The cornea does not lose any of its sensibility as tested with cotton wool. The duration of relief has varied from 4 to as much as 36 hours. When the pain returns, it is usually mild and can be abolished again in a few seconds by the reinstillation of histamine.

This treatment has been used by the author and his father since 1941. In each instance the episcleritis subsided completely in about three days. They are unable to judge whether or not a recalcitrant episcleritis will yield to this treatment because all patients treated to date have been relieved. The number of patients treated, five, is too small to speak in terms of unqualified success. At least the drug is not harmful to the eye, if properly controlled, and its use will tide the patient over a very painful episode while search is being made for the cause of the episcleritis.

The only side reactions thus far encountered are as follows:

In one case the chemósis was enough to show in the palpebral fissure when the lids were closed. The conjunctiva was normal after use of a patch and bland ointment for 24 hours. Strong miosis can be produced by repeated instillations, even in the presence of atropine mydriasis. In patients so tested there was no undue chemosis. In one patient with posterior synechiae from an old iritis which had flared mildly, some of the more medial synechiae ruptured, but the iritis quieted nicely. Skin sensitivity with typical histamine headache later relieved by desensitization occurred in one patient but there was no unusual conjunctival chemosis. The conjunctival flush produced could be abolished in a few seconds by a drop of ephedrine sulphate (5 per cent).

Case Reports

Case 1. A woman, 45 years of age, reported at the office with her left eye painful for the past 12 hours. Examination showed an episcleric node in the lower temporal quadrant of the eye, exquisitely tender to palpation. The remainder of the examination contributed no pertinent information. Two drops of histamine diphosphate (1:1,000) were instilled. The conjunctiva began to flush in about 12 seconds. There was a stinging sensation and the conjunctiva became markedly flushed in about 50 seconds. The conjunctiva was slightly chemotic, the pain was entirely gone, and the node could be freely palpated without pain. The eye remained quiet for 18 hours, when it began to pain slightly. The patient returned at the end of 24 hours with moderate pain and histamine was instilled again. The same cycle of stinging and chemosis was repeated with relief of pain. The patient reported that following the first instillation the eye remained red for almost 4 hours and then gradually over another 5 or 6 hours became normal except for the episcleric node which remained congested. At the second visit the node appeared less prominent than the first day and was definitely less tender than before. After the second instillation, the eye became perfectly quiet and the patient failed to report for the general physical survey indicated.

Case 2. A man, aged 64 years, reported to the office after his right eye had been painful for two days. Examination showed an episcleric node in the

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upper temporal quadrant, tender to palpation. Two drops of the histamine preparation produced a flush in about 12 seconds and relief in 40 seconds. The chemosis was very slight. Pain returned in about 24 hours, but was so mild that the patient delayed returning until the following day. Histamine again brought relief. A thorough medical examination failed to reveal any source of infection. This attack subsided after the third instillation of the preparation. This patient reported back two months later with another episcleric node in the same eye and again in the temporal side. Histamine was used for two days with complete relief.

Case 3. A man, 25 years of age, an infantryman in the U.S. Army, reported to the hospital with chronic tonsillitis and history of repeated sore throat. Two days after tonsillectomy the right eye developed an episcleric node on the lower temporal quadrant. Histamine diphosphate instilled in the eye gave relief for almost six hours. A second dose kept the patient comfortable until the next day. Treatments on each of the two days following gave complete relief. It was felt that the infected tonsils were the source of his trouble in view of his otherwise negative physical examination.

Case 5. A 28-year-old man reported to the office with a left eye which had been painful for two days. There was a typical episcleric node in the lower temporal quadrant. This was very tender on palpation. Histamine diphosphate, 4 drops, was instilled. There was relief in 45 seconds which lasted about seven hours. The eye became painful again but not markedly so. Another instillation kept the patient comfortable through the night. The eye was only slightly tender and painful the next morning. Histamine administered once on the second day kept the patient comfortable for 24 hours, and a final dose was then sufficient. This man was referred to an internist for a complete physical checkup. (Am. J. Ophth., July '47 - E. M. Shepherd)

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Effects of Intravenous Injection of Nicotine on the Circulation: Careful studies of the nicotine content of tobacco smoke have been made by Baumberger. He found that the amount of nicotine in the puffed smoke of one cigarette is about 4.5 milligrams. Four cigarettes are equivalent to one mild cigar. The frequency of puffing determines the rate of absorption.

Approximately 66.7 per cent of the smoke and, presumably, of the nicotine drawn into the mouth is absorbed. If the smoke is inhaled, 88.2 per cent is absorbed. Assuming 66.7 per cent absorption and a rate of puffing of five per minute, the dosage rate of nicotine from cigarette smoke would be 0.46 mg. per minute, or 27.5 mg. per hour. With inhalation, and hence absorption of 88.2 per cent, the dosage rate would be 0.6 mg. per minute, or 36 mg. per hour.

On the basis of these figures, about 3 mg. of nicotine are absorbed from a cigarette if not inhaled, and 4 mg. if the smoke is drawn into the lungs.

Observations on the effects of smoking and of nicotine injection on the circulation have recently been reported by Roth, McDonald, and Sheard; they also reviewed earlier work. The electrocardiograms of normal persons have shown lowering of the T waves, and sometimes inversion in Leads II and III. Of particular interest are two cases of coronary heart disease described by

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Wilson and Johnston. In both patients, after smoking one or two cigarettes, changes occurred in the electrocardiogram resembling those seen in the early stages of infarction of the posterior wall of the heart. Because of the lack of parallelism between the magnitude of the changes and cardiac work, as represented by increase in heart rate and blood pressure, Wilson and Johnston concluded that nicotine or some other ingredient of tobacco smoke sometimes induces coronary spasm in patients subject to anginal attacks. Graybiel and collaborators and Pickering and Sanderson, on the other hand, were inclined to ascribe cardiac pain induced by smoking to the increased work of the heart rather than to constriction of the coronary arteries.

Determinations of cardiac output after smoking were made in five normal persons by Grollman, using the acetylene method. His results, like those of the authors, varied, with increases ranging from 0.1 to 1.3 liters per minute. The largest increase was observed in an habitual cigarette smoker after he had smoked three cigars. Another cigarette smoker, after smoking two cigars, showed an increase in output of only 0.1 liter per minute. Moderate smoking yielded intermediate values.

In 1912, Cannon, Aub, and Binger demonstrated, in cats, that the intravenous injection of nicotine, in doses of from 3.5 to 7.5 mg., resulted in augmented adrenal secretion. Such doses are comparatively much larger than those employed by the authors.

Widely different effects on the level of the blood sugar after smoking have been described by various investigators and these have been summarized by Dill and associates. Increases of from 10 to 40 per cent after one cigarette, and a decrease of 27 per cent after one cigar, have been reported. Other authors have noted both increases and decreases.

Dill's group made frequent determinations after the inhalation of the smoke of one cigarette in the course of from five to ten minutes. The amount of nicotine absorbed was thus comparable to the dose used in the authors' studies. Nine-tenths of the measurements, in their ten fasting subjects, were within 5 per cent of the rest level.

There is ample evidence that the important ingredient of tobacco smoke, with respect to its action on the cardiovascular system, is nicotine. Other toxic constituents, such as the pyridine bases, hydrocyanic acid, and ammonia, are present in amounts so small that they exert no appreciable effects. The concentration of carbon monoxide in the blood after smoking, except in extreme instances, does not reach sufficiently high levels to embarrass the circulation at ordinary altitudes. By observing the effects of nicotine after intravenous injection, any possible action of these other substances is eliminated and no factors are present which might induce reflex disturbances, such as irritation of the mucous membranes or the act of inhalation. The results of such a study cannot be translated into terms directly applicable to the smoking of tobacco, but they furnish information concerning the immediate response of the heart and circulation to the most active substance absorbed from the smoke.

In this study, observations on changes in the heart rate, blood pressure, cardiac output, and electrocardiogram were made on 46 persons who were given intravenous injections of 2.0 mg. of nicotine tartrate, which is approximately equivalent to 0.6 mg. of nicotine alkaloid. This corresponds to the

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amount of nicotine absorbed on inhaling the smoke of a cigarette 5 times in the course of one minute, as estimated by Baumberger. The intravenous dose of 2.0 mg. of the tartrate, therefore, was relatively small, but it was introduced directly and quickly into the circulation and was large enough to cause reactions which were readily measurable. Of these 46 persons studied, eighteen (group 1) were normal and ranged in age from 22 to 74 years; the average age was 32.7 years. Eleven were smokers and seven were nonsmokers. There were twenty-four (group 2) with coronary heart disease. Of these, twenty suffered from attacks of anginal pain and ten had hypertension, and in four a healed myocardial infarct was known to be present. The ages of those with heart disease ranged from 40 to 78 years, with an average of 55.9 years. Seventeen of them were smokers and seven were nonsmokers. There were four patients (group 3) with peripheral vascular disease. The diagnosis was Raynaud's disease in two, thromboangiitis obliterans in one, and scleroderma with gangrene of the fingers in one. The ages of these four ranged from 21 to 50 years, with an average of 39.5 years. Three were smokers and one was a nonsmoker.

No significant differences between the three groups were apparent on statistical analysis. There was much less variation in repeated tests in the same individual than in different individuals. There were no significant differences in reaction between smokers and nonsmokers in any group. After the injection of nicotine, slight changes in the electrocardiogram were observed in some members of all groups. Significant changes were observed in four patients with coronary heart disease. In two of these, who suffered from spontaneous anginal attacks, pain was associated with the appearance of electrocardiographic changes. In all groups, individual differences in sensitivity to nicotine were evident in the number and severity of the symptoms which followed its injection. The most frequent complaint was dizziness. Other symptoms were tingling, faintness, and nausea. Vomiting and brief circulatory collapse occurred in one normal young man who had never smoked. Nicotine injection caused no consistent variations in the level of the blood sugar in fasting subjects, although there were fluctuations both upward and downward. Because of the small dose of nicotine injected and the failure to induce hyperglycemia, it seems improbable that augmented adrenal secretion was responsible for the circulatory reactions observed. In any case, these were initiated by nicotine. Variation in the effects of nicotine on the circulation is as great in patients with cardiovascular disorders as in normal persons. This variation depends to a greater extent upon individual susceptibility than upon the presence of disease. In some patients with coronary heart disease, the injection of nicotine induces a state of coronary insufficiency. This may be the result of constricting the coronary arteries or of increasing the work of the heart. Probably both mechanisms are concerned. (Am. Heart J., July '47 - M. N. Boyle et al.)

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Effect of the Leukocytosis-Promoting Factor of Exudates When Injected in Connection with Inflammation: In studies previously reported there was demonstrated in exudative material the presence of a factor capable of reasonably explaining the leukocytosis frequently accompanying inflammatory processes. This factor when injected into animals not only induces a discharge of immature granulocytes of the bone marrow but produces a hyperplasia or growth of granulocytes and of megakaryocytes in the marrow. Its activity in human beings suggests that the material may have a clinical application. It is well known that the

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prognosis of many infectious processes is to a large extent referable to the number of circulating leukocytes. If, therefore, with a given local inflammation the leukocyte level could at will be raised for a protracted period, a definite additional tool would be available when dealing with a number of infectious processes.

Using intravascular injections of the leukocytosis-promoting factor, experiments were carried out on dogs after a pleural inflammation had been incurred in them through injections of turpentine. Control dogs received only the irritant.

Observations clearly indicated that the number of circulating leukocytes can be increased and sustained at a high level by the use of this factor. The combination of inflammation and injection of leukocytosis-promoting factor reenforces the natural leukocytosis which tends to develop with some types of inflammatory reaction. Under such circumstances the leukocytosis is sustained for several days longer than when there is an inflammation alone or when the leukocytosis-promoting factor is introduced without a concomitant inflammation. Some observations suggest also that this factor when injected several days prior to an acute inflammation of the pleura likewise tends to maintain a high leukocyte level in the blood for longer intervals. (Arch. Path., June '47 - V. Menkin)

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Study on Penicillin-Resistant Gonococci: The Antibiotics Study Section of the National Institute of Health allocated small amounts of several penicillin fractions to Dr. Charles M. Carpenter, University of Rochester, School of Medicine and Dentistry, for use in his study of the bactericidal effect of penicillin fractions on penicillin-resistant gonococci.

The following is a brief progress report of Doctor Carpenter's work:

Procedure: Three strains of the gonococcus, #5609, #3215, and #515 were made resistant to 16.0, 1.0, and 2.0 units of sodium penicillin (Merck & Co., lot no. 1113) respectively, in vitro. They were then tested against each penicillin fraction as follows: 0.2 ml. of a 48-hour blood broth culture of each strain was inoculated into increasing concentrations of the penicillin fractions F, G, K, and X, in tubes of blood broth, totaling 3.0 ml. After incubation for 48 hours at 36° C., subcultures were plated on chocolate agar and similarly incubated.

Results:

Strain	Penicillin	Growth of Gonococcus in Units per Ml. of Medium						
		4.0	8.0	10.0	12.0	14.0	16.0	Control
5609	Sodium Penicillin	****	****	****	****	***	***	****
	Fraction F	****	****	****	****	****	****	****
	G	****	****	***	**	**	*	****
	K	****	****	***	**	**	**	****
	X	-	-	-	-	-	-	****
		0.16	0.32	0.64	1.0	2.0	4.0	Control
3215	Sodium Penicillin	****	****	**	*	-	-	****
	Fraction F	****	****	****	**	-	-	****
	G	***	***	*	*	-	-	****
	K	**	**	**	**	**	*	****
	X	-	-	-	-	-	-	****
		0.32	0.64	1.0	2.0	4.0	6.0	Control
515	Sodium Penicillin	****	****	****	***	-	-	****
	Fraction F	****	****	****	****	***	-	****
	G	***	***	**	-	-	-	****
	K	****	***	***	***	***	**	****
	X	-	-	-	-	-	-	****

- = No Growth
* = Growth

Conclusions: The growth inhibitory action of crystalline penicillin fractions G and X was greater than that of sodium penicillin to which the strains of the gonococcus had been made resistant. Fraction F was only equally as active as sodium penicillin. Fraction K was less inhibitory than the regular commercial sodium penicillin.

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The Influence of Cobalt on the Anemia Associated with Inflammation: Although the bone marrow usually appears to be normal or even hyperplastic in cases of anemia associated with infection, the anemia is refractory to therapy

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and is relieved only when the underlying infection is successfully eradicated. The anemia is accompanied by a profound metabolic disturbance as indicated by the finding of hypoferremia, hypercupremia, and elevated erythrocyte protoporphyrin levels. It is recognized, also, that infection is associated with a disturbance in protein metabolism; thus the serum albumin decreases, and increased excretion of urea in the urine has been reported.

As part of a study of the pathogenesis of the anemia associated with inflammation, and in an attempt to find a means whereby the failure to form hemoglobin might be overcome, it was considered of interest to study the effect of cobalt.

By the administration of cobalt, polycythemia can be produced in many laboratory animals. The increase in red cells and hemoglobin has been reported as being due to an actual increase in red cell mass, and an increase in reticulocytes in the blood has been observed. The mean corpuscular volume is found increased (due mainly to greater cell thickness), the bone marrow becomes hyperplastic, and metaplasia occurs in the spleen, liver, and kidneys. The administration of cobalt has been found to overcome the anemia produced by the toxic action of benzol in rabbits and that caused by protein deficiency in rats and has been reported even to relieve the physiologic and nutritional anemia of children. Kleinberg and his associates found that in rabbits made anemic by the injection of from 0.5 to 1.0 ml. of benzene for a period of 5 weeks, the daily administration of cobalt nitrate overcame the anemia despite the continued administration of benzene. The marrow of rats treated with cobalt and benzene was hyperplastic, but the marrow of rats given only benzene was fatty and aplastic. It has been shown by Dorrance et al. that the work performance of rats having cobalt polycythemia is increased under conditions of anoxia, thus indicating that the increased hemoglobin is useful for oxygen carriage.

In this study, three experiments involving observations on 108 rats were carried out. Since it has been shown that sterile turpentine abscesses have the same effect in animals as chronic infection, this means was employed to produce inflammation.

It was found that by the simultaneous administration of cobalt the anemia associated with inflammation, as produced by the injection of turpentine, could be prevented from developing and polycythemia appeared instead. This effect was accompanied by hypoferremia and an increase in erythrocyte protoporphyrin values similar to those encountered when anemia develops in association with infection. Similar, though less marked, chemical changes were observed when only cobalt was given and polycythemia was produced. A decrease in plasma albumin was noted in rats injected with cobalt or turpentine, or both, but this was not accompanied by an increased excretion of urinary nitrogen as measured by the amounts of urea and ammonia in the urine.

Since the anemia associated with infection is known to be refractory to therapy, it is of great interest that the administration of cobalt appears to overcome the retardation of hemoglobin formation which is produced by inflammation.

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Elucidation of the mode of action of cobalt might be expected to yield valuable information concerning the pathogenesis of the anemia of infection.

As yet, however, the way cobalt produces polycythemia in normal animals is not known. It has been reported that the feeding of liver or the injection of liver extract or of ascorbic acid tends to counteract or nullify the effect of cobalt. According to other reports, cobalt did not produce pblycythemia in splenectomized rats or when the diet was deficient in iron or copper. In fact, in the absence of copper, anemia developed. When cobalt was fed prior to the addition of iron and copper, the normal response to such supplements given to dogs made anemic by hemorrhage was inhibited. The report of Barron and Barron that small amounts of cobalt inhibit the respiration, in vitro, of various tissues, notably, bone marrow, could not be corroborated by Warren et al. It was also demonstrated by the latter workers that the erythroid hyperplasia of bone marrow in cobalt-polycythemic animals is independent of whether or not the marrow has an intact peripheral innervation. They suggested as a mode of action of cobalt that there is some effect on the liver whereby the formation there of metabolic precursors requisite for red cell production is enhanced. That the action of cobalt may be based on a neural mechanism is a hypothesis arising from the reports of Davis that choline and certain other vasodilator drugs depress or prevent the polycythemia which follows cobalt administration. Griffith et al. have proposed that interference with cellular oxidation, with the formation of complexes with sulfhydryl compounds, as for example with glutathione, may be the stimulus to the hemopoietic system which causes cobalt polycythemia. These investigators observed that methionine, cystine, and cysteine decrease the toxicity of cobalt. Since choline is metabolically related to the sulfur-containing amino acids, its counteracting effect on cobalt polycythemia might be explained in the same way. Orten and Orten suggested that cobalt overcomes anemia due to protein deficiency in rats by making the proteins of the "metabolic pool" more available for hemoglobin synthesis.

Kato and Iob found that the spleen and bone marrow of dogs and rabbits fed cobalt in addition to iron contained less iron than those of animals given iron alone. This would suggest a more complete utilization of iron for erythropoiesis in the presence of cobalt. Whatever might be the means whereby cobalt accomplishes this, such an explanation is consistent with and could explain observations made by the authors whose studies have shown that the hypoferremia associated with infection is not due to a lack of iron and cannot be corrected by infusing iron intravenously but must be assumed to be due to some disturbance related to iron metabolism whereby the utilization of iron is affected. This fault would appear to be corrected in whole or in part by the administration of cobalt.

It is of interest that the plasma iron level of rats given cobalt was lower than in the controls and that the erythrocyte protoporphyrin was increased. The hypoferremia is consistent with the assumption that hemoglobin synthesis is accelerated by cobalt. A rise in erythrocyte protoporphyrin is associated, according to Watson, Grinstein, and Hawkinson, with normoblastic activity of the bone marrow, a feature which has been observed repeatedly in cobalt polycythemia.

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The observations cited in the present report would indicate that neither cobalt nor turpentine seems to increase protein catabolism, since no appreciable difference was found in urinary nitrogen (urea plus ammonia) excretion. The normal nitrogen excretion of the rats receiving only cobalt would support the opinion of several authors that cobalt is not toxic in the doses ordinarily needed to produce polycythemia. The lower growth rate may be explained by a decreased food intake, since Frost et al. claim that cobalt produces anorexia. Unfortunately, food intake was not measured in the animals used in this study.

The observations cited are consistent with the hypothesis that cobalt favorably influences the utilization of iron for the synthesis of hemoglobin.

It is proposed to repeat and extend in larger animals the studies reported here, since thereby it may be possible to carry out more detailed observations than are possible in the rat. (Blood, J. Hematol., July '47 - M. M. Wintrobe et al.)

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Tantalum Oxide and Wound Healing: Tantalum is a metallic element having an atomic weight of 180.88 and a density of 16.6. It has had some use in surgery, chiefly in the form of plates for substitution in cranial defects. It has been praised as being biologically inert.

Olson reported that tantalum foil placed over wounds from industrial accidents where there had been partial loss of thickness of the skin seemed to produce epithelialization faster than any other method of treatment. It was assumed that this apparent stimulating action was due to the oxide coating of the tantalum which is always present. He then prepared a fine tantalum oxide powder and used it in treating small wounds and burns of the extremities. He reported that the acceleration of healing and the absence of pain were noteworthy. Since his studies did not include controls, the authors decided to carry out additional wound-healing experiments.

Small cutaneous wounds made on the abdomen of guinea pigs were treated with sterile tantalum oxide powder. The healing time of these wounds was compared with that of control wounds (on the same guinea pigs) dressed with sterile gauze or sterile talc. No consistent acceleration of healing of the tantalum oxide-treated wounds could be demonstrated under the conditions of the experiment. (Proc. Soc. Exper. Biol. and Med., May '47 - L. L. Cowley and B. E. Brush)

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Response of Experimental Hypertension to a Rice and Fruit Juice Diet: Dietary treatment of hypertension has received the attention of many investigators. Fishberg in summarizing the evidence concluded that no dietary treatment is known which has a specifically favorable effect on essential hypertension. More recently Kempner (See Bumed News Letter of 16 August 1946) has reported striking therapeutic results in a majority of patients with both "primary" and

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"secondary" hypertension by the use of a diet of rice, fruit, and fruit juices. Grellman, Harrison, and co-workers have suggested that rigid sodium restriction is responsible for the changes observed by Kempner.

The purpose of this communication is to report preliminary studies on 12 hypertensive dogs kept for 8 weeks on the Kempner regime. The hypertension in these animals, which had been maintained for periods of from 2 to 4 years, had been produced by a nephrosclerosis which followed the intravenous administration of streptococci.

Prior to the institution of the "rice" diet the animals had been fed on meat and dog biscuits, providing approximately 900 calories per day. The basic experimental diet consisted of 170 Gm. of rice, 340 c.c. of fruit juice, and 60 Gm. of sugar. It contained approximately 13 Gm. of protein and 212 Gm. of carbohydrate with a total value of 900 calories. Daily supplements of 6000 I.U. of vitamin A, 1600 I.U. of vitamin D, 25 mg. of niacinamide, 1.6 mg. of thiamine chloride, and .45 Gm. of ferrous sulfate were administered. Since the animals often refused part of the diet offered, the basic diet represents the maximum possible intake. One dog refused the diet entirely and died before any significant observations were made.

A significant reduction in arterial pressure occurred in 10 of the 11 dogs. Before the induction of hypertension the blood pressure in the 11 dogs averaged 120.3 mm. Hg; before beginning the diet their blood pressures averaged 181.6 mm. Hg, and their weights averaged 12.1 Kg.; after 8 weeks of the diet blood pressures averaged 138 mm. Hg and weights, 9.6 Kg. The greatest fall in pressure was found in the animals with the highest initial levels. No direct quantitative correlation could be established between the amount of weight loss and the extent of fall in blood pressure.

The average blood nonprotein nitrogen was 23.6 mg. per 100 c.c. before the diet and after 8 weeks had decreased to 18 mg. per 100 c.c. The average total plasma protein was 6.20 Gm. per 100 c.c. initially, and 6.22 Gm. per 100 c.c. after 8 weeks.

It appears that the Kempner regime is capable of causing significant lowering of the arterial blood pressure of dogs made hypertensive through the induction of nephrosclerosis. The role of weight loss, salt restriction, and nitrogen balance in this result requires further study. (Proc. Soc. Exper. Biol. and Med., May '47 - G. F. Dick and W. B. Schwartz)

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Reports on USN Research Projects:

(Restricted)

Comparison of Flotation Characteristics of Various Types of Life Preservers. For some time designers of life preservers have been concerned with designing a jacket which will float conscious or unconscious survivors with their heads and faces clear of the water and in as nearly a vertical position as is possible.

(Restricted)

In order to determine the flotation characteristics of 12 life preservers, tests were conducted on four navy volunteers of different recognized body types at Silver Springs, Florida, under conditions simulating field use. From a tower about 11 feet high a subject jumped into the water while wearing a jacket, and after returning to the surface attempted to remain relaxed so as to permit the life preserver to determine his position. The subject then swam around, turning face downward in the water feigning unconsciousness, and again the life jacket was permitted to determine the position of the wearer. The movements of each subject both below and above the surface of the water were recorded by means of motion picture photography. From the tests, which were limited in number, it appeared that a fibrous glass-filled life preserver designed by the Mellon Institute gave the best all-round performance. Because it is donned in the same manner as the Navy Standard Kapok Life Preserver, no indoctrination would be necessary for that measure; it is comfortable both in and out of water, and the relocation of the buoyant material tends to float a majority of wearers in the desired position. (Proj. X-691, Rep. No. 1, 27 May '47 - Nav. Med. Res. Inst., Bethesda, Md. - B. E. Jennings and G. J. Duffner)

(Not Restricted)

A Colorimetric Method for the Determination of Citrate Ion in Blood and Plasma. This highly sensitive colorimetric method for the determination of citrate ion in whole blood and plasma is a modification of previous methods based on the conversion of the citrate ion into a bromoacetone derivative, and the determination of the amount of bromine present as the bromoacetone. The citrate ion is converted into the bromoacetone derivative by oxidation with permanganate under highly acid conditions and in the presence of free bromine. The bromoacetone derivative formed is extracted with petroleum ether, and the extract is carefully washed to remove all traces of bromide. The bromoacetone is decomposed and the liberated bromide is extracted from the petroleum ether by shaking with an aqueous sulfite solution. The liberated bromide is oxidized to bromate with hypochlorite; the bromate formed is then allowed to react with iodide to liberate free iodine, using molybdate as a catalyst, and the yellow color of the liberated iodine is measured colorimetrically. This method is accurate to within 5 micrograms. (NM 007 027, Rep. No. 1, 20 May '47 - Nav. Med. Res. Inst., Bethesda, Md. - P. D. Boyer and G. H. Wolcott)

NOTE: Those interested in seeing copies of the complete reports should address their request to the research activity from which the report originates. Opinions or conclusions contained in these reports are those of the authors. They are not to be construed as necessarily reflecting the views or the endorsement of the Navy Department. Reference may be made to those reports marked "Not Restricted" in the same way as to published articles noting authors, title, source, date, project number, and report number. No part of the content of RESTRICTED reports may be published, reproduced, or referred to in articles for publication without permission obtained through the Bureau of Medicine and Surgery.

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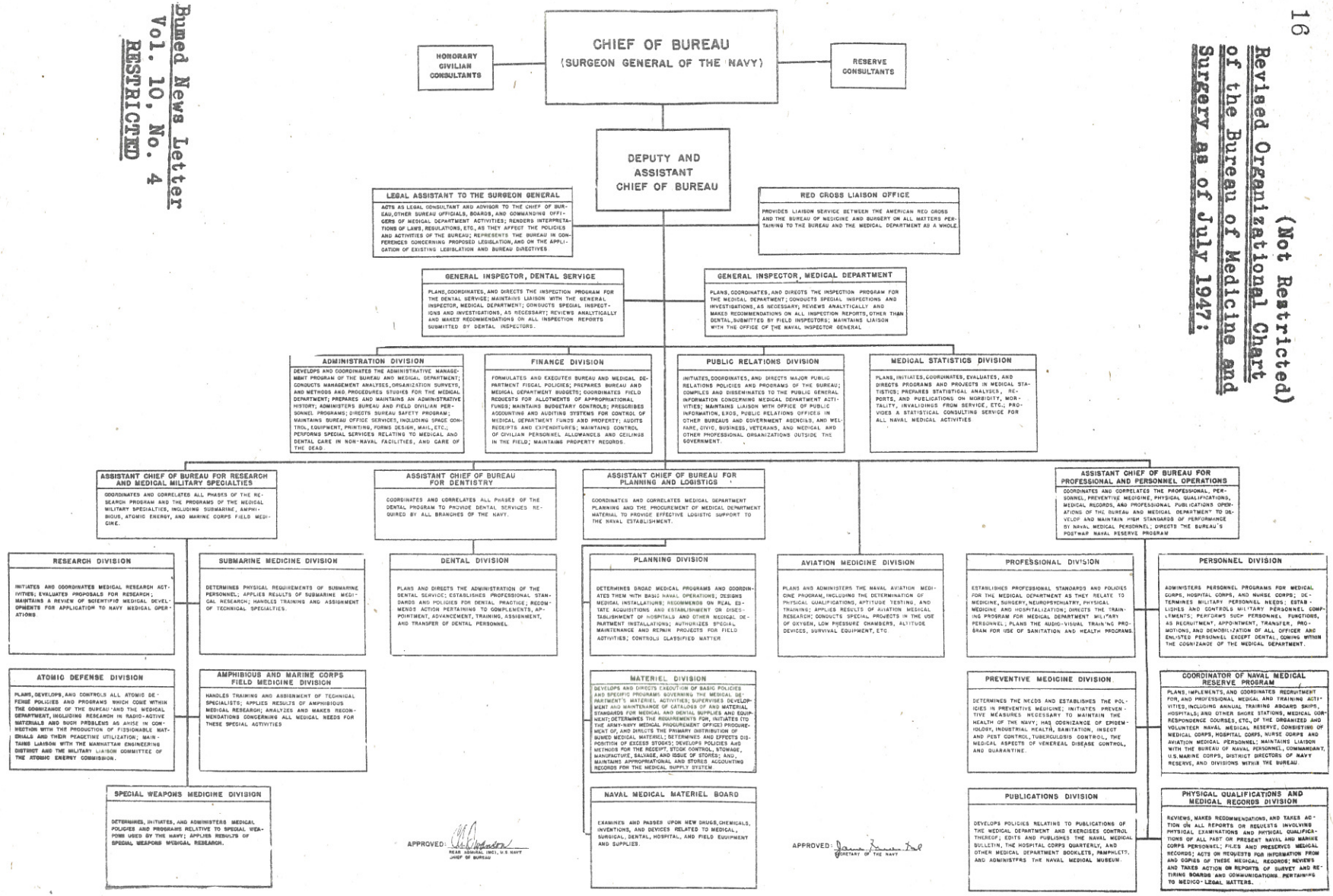
Bumed News Letter
Vol. 10, No. 4
RESTRICTED

BUREAU OF MEDICINE AND SURGERY

(Not Restricted)
Revised Organizational Chart
of the Bureau of Medicine and
Surgery as of July 1947:



(Not Restricted)

International Association for Dental Research: At the recent meeting of the Membership Committee of the International Association for Dental Research held in Chicago, Illinois, the following were appointed to membership in the Association:

Commander G. Parke, DC, USN, U. S. Naval Dental School.
Commander S. R. Howell, DC, USN, Naval Medical Research Institute.
Lt. Commander F. Losee, DC, USN, U. S. Naval Dental School.
Dr. O. R. Reynolds, Medical Sciences Division, Office of Naval Research.

The International Association for Dental Research is recognized throughout the world as the official research association for dentistry.

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(Not Restricted)

Postgraduate Training in Medical Specialties: A recent review of the requests received in the Bureau for graduate training has revealed a serious shortage of requests for training in anesthesiology, otolaryngology, pathology, psychiatry, and urology. The shortage is most acute in anesthesiology, otolaryngology, and urology. Requests are desired from medical officers of the regular Navy, and from those of the Naval Reserve who apply for transfer to the regular Navy. Applications should be submitted in accordance with the information contained in the Bumed News Letter of 23 May 1947 and may be made by despatch. (Professional Div., BuMed)

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(Not Restricted)

Re Safety Precautions Against Explosive Anesthetic Gases in Surgical Operating Rooms: Material that is highly informative and useful for all Medical Department personnel is contained in BuMed Circular Letter No. 47-97, a copy of which is available herein, beginning on page 24.

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(Not Restricted)

Training in the Medical Aspects of Radioactive Substances: The Bureau of Medicine and Surgery announces the availability of three places for medical officers of the Navy in a six months' course entitled, The Medical Aspects of Radioactive Substances. This course is to be given at The University of Chicago, beginning 30 September 1947. Medical officers from the U. S. Army and U. S. Public Health Service will also be in attendance.

The course will consist of didactic and laboratory training in the basic sciences and phases of medicine as they apply to atomic energy. Previous training and experience in the field of atomic energy are not necessary.

(Not Restricted)

Requests are desired from medical officers of the regular Navy and must contain an agreement not to resign during the course and to remain in the Navy for a period of three years following the completion of the course. Reserve medical officers may apply providing they request transfer to the regular Navy and providing sufficient time exists to effect their transfer prior to 30 September 1947. Requests should be submitted by despatch and the routine request containing the Service agreement should follow by regular mail. (Professional Div., BuMed)

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(Not Restricted)

Training in Psychiatry: The Bureau of Medicine and Surgery announces the availability of a residency in psychiatry of 12 months' duration at St. Elizabeth's Hospital, Washington, D.C. The Medical Corps of the Navy has long been associated with training in psychiatry at this institution.

Additional appointments for residencies in psychiatry at approved institutions, both naval and civilian, are available. (Professional Div., BuMed)

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(Not Restricted)

Training Duty for Dental Reserve Officers: Training duty for Reserve dental officers has been arranged at the U. S. Naval Dental School, National Naval Medical Center, Bethesda, Maryland, for the period commencing 27 October 1947 and ending 8 November 1947. This duty will consist of lectures, demonstrations, and conferences. Orientation tours which are designed to familiarize Naval Reserve dental officers with typical Navy and Marine Corps organizations will also be conducted.

The capacity of the Naval Dental School is limited with respect to this training duty. Accordingly, the total number which can be accommodated is being apportioned among the naval districts except that, because of limited funds available and the costs of travel, no quota is being assigned to the Eleventh, Twelfth, and Thirteenth Naval Districts.

Requests for assignment to this training duty should be submitted to the commandant of the naval district in which the officer maintains his official residence. (Dental Div., BuMed)

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(Not Restricted)

Dental Officers Assigned Postgraduate Instruction: The following naval dental officers have been authorized to attend courses offered at the University of California College of Dentistry during the period from 4 August to 13 September:

(Not Restricted)

Commander Robert W. Wheelock, DC, USN - Dental Roentgenology
Commander Emmet L. Manson, DC, USN - Dental Roentgenology
Commander Frank I. Gonzalez, Jr., DC, USN - Dental Roentgenology
Commander Stanley W. Eaton, DC, USN - Crown & Bridge Prosthodontia
Commander Richard C. Shaw, DC, USN - Crown & Bridge Prosthodontia
Commander Howard T. d'Arc, DC, USN - Crown & Bridge Prosthodontia
Commander Ward M. Mortell, DC, USN - Prosthodontia
Commander Earl A. Goldsmith, DC, USN - Prosthodontia
Lieut. Comdr. Robert A. Middleton, DC, USN - Crown & Bridge Prosthodontia

All of these officers are assigned to permanent duty in naval activities located in the San Francisco Bay Area and will attend the courses on a part-time basis. The expenditure of funds from the Bureau of Medicine and Surgery Training Allotment has been authorized to cover the tuition fees for these courses of instruction. (Dental Div., BuMed)

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(Not Restricted)

Special Training Duty in Ocular Prosthesis for Dental Reserve Officers: Ocular prosthesis as developed by the U. S. Naval Dental Corps has aroused great interest, and a demand has been created among civilians for the acrylic eye as constructed by the Navy.

The Surgeon General of the Navy has approved placing this technic in the hands of dentists as they are best fitted by their training to carry out procedures of this nature.

Because dental officers of the Naval Reserve on inactive duty may in the future be called upon to do ocular prosthesis for military personnel, it is believed that this training will enable them to serve the public in peacetime as well as the military forces in time of emergency.

Accordingly, the U. S. Naval Dental School, National Naval Medical Center, Bethesda, Maryland, will give special training in ocular prosthesis to dental officers of the Naval Reserve during the period from 6 October 1947 to 18 October 1947, inclusive.

One Reserve dental officer from each naval district, except the Eleventh, Twelfth, and Thirteenth (because of the limited funds and the costs of travel), will be accepted for this training.

Requests for assignment to this training duty should be submitted to the commandant of the naval district in which the officer maintains his official residence. (Dental Div., BuMed)

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(Not Restricted)

Association for Advancement of Research on Multiple Sclerosis: Announcement has been made of the formation of the Association for Advancement of Research on Multiple Sclerosis with headquarters at the Academy of Medicine in New York. This organization was initiated by a group of the patients themselves and those interested in the disease, with the cooperation of some of the leading neurologists in the country.

The purposes of the new association are to: (1) coordinate research on multiple sclerosis in this country and abroad; (2) gather statistics on its prevalence and geographic distribution; (3) act as a clearing house for information on the disease; (4) educate the public on the problem of multiple sclerosis; and (5) collect funds to stimulate and support research on multiple sclerosis and allied diseases.

At the present time the association plans to conduct a nationwide membership drive to enroll patients with multiple sclerosis as well as the public. It is expected that important statistical data concerning the disease now lacking can thus be obtained.

Little is known about the cause or cure of multiple sclerosis. Research on this disease thus far has been hampered because of the lack of financial resources. Moreover, it has been uncoordinated for want of an organized means to ascertain what research is being done in the field and thereby effect a systematic plan for future investigations. Surveys made in Baltimore and Boston indicate that multiple sclerosis is more prevalent than infantile paralysis. (Conn. State M. J., July '47 - Editorial)

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(Not Restricted)

Official Changes in BuMed Section of Catalog of Navy Material: The following item is now available for issue by Naval Medical Supply Depots:

Expendability	JAN No.	Nomenclature and Description	Unit	Standard Unit Price
	10-475-152	Pharmacopoeia of the United States of America, 13th Edition	Each	$7.02
	(Latest Edition)			

(MatDiv, BuMed)

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(Not Restricted)

Pay of Medical and Dental Officers Increased: A copy of the so-called inducement bill affecting Naval medical and dental officers as passed by the 80th Congress and signed by the President of the United States on 5 August 1947 follows:

A BILL

To provide additional inducements to physicians, surgeons, and dentists to make a career of the United States military, naval, and public health services, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Army-Navy-Public Health Service Medical Officer Procurement Act of 1947".

TITLE I

PAY OF PHYSICIANS, SURGEONS, AND DENTISTS

Sec. 101. The Pay Readjustment Act of 1942 (56 Stat. 359), as amended, is hereby further amended by inserting immediately after section 1 thereof the following new section:

"Sec. 1A. (a) The term 'commissioned officers', as used in this section, shall be interpreted to mean only (1) those commissioned officers of the Medical and Dental Corps of the Regular Army and Navy and commissioned medical and dental officers of the Regular Corps of the Public Health Service who are on active duty on the effective date of this section; (2) those officers who are hereafter commissioned in the Medical and Dental Corps of the Regular Army and Navy or as medical and dental officers of the Regular corps of the Public Health Service during the five-year period immediately following the effective date of this section; (3) such officers, now or hereafter commissioned in the Medical and Dental Corps of the Officers' Reserve Corps, the Naval Reserve, the National Guard, the Army of the United States, or as medical and dental officers of the Reserve Corps of the Public Health Service, who may, during the five-year period immediately following the effective date of this section, volunteer and be accepted for extended active duty of one year or longer; (4) general officers appointed from the Medical and Dental Corps of the Regular Army, the Officers' Reserve Corps, the National Guard, or the Army of the United States who are on active duty on the effective date of this section; (5) general officers who may hereafter be appointed from those officers of the Medical and Dental Corps of the Regular Army, the Officers' Reserve Corps, the National Guard, or the Army of the United States who are included in (1), (2), or (3) above.

"(b) In addition to any pay, allowances, or emoluments that they are otherwise entitled to receive, commissioned officers as defined in subsection (a) of

(Not Restricted)

this section shall be entitled to pay at the rate of $100 per month for each month of active service following the date of enactment of this section: Provided, That such sum shall not be included in computing the amount of increase in pay authorized by any other provision of law or in computing retired pay: Provided further, That the total amount which may be paid to any one officer under the authority contained in this section shall not exceed $36,000: And provided further, That the commissioned officers described in subsection (a) (3) of this section shall receive the pay provided by this subsection only during periods of volunteer service."

Sec. 102. This title shall become effective on the first day of the first calendar month following its enactment, and the payments herein provided shall not accrue for any period prior thereto.

TITLE II

ORIGINAL APPOINTMENTS OF MEDICAL AND DENTAL OFFICERS

Sec. 201. Subject to any limitation of the commissioned strength of the Army and Navy prescribed by law the President, by and with the advice and consent of the Senate, is hereby authorized to make original appointments to permanent commissioned grades, with rank not above that of colonel in the Medical and Dental Corps of the Army, and not above that of captain in the Medical and Dental Corps of the Navy in such numbers as the needs of the services may require. Such appointments shall be made only from qualified civilian doctors of medicine and dentists who are citizens of the United States, and who shall have such other qualifications as the Secretary of War and the Secretary of the Navy may prescribe for their respective services. The doctors of medicine and dentists so appointed in the Navy shall be carried as additional numbers in rank, but shall not increase the authorized numbers of commissioned officers of the Medical and Dental Corps of the Regular Navy. The doctors of medicine and dentists so appointed in the Army shall be credited for purposes of promotion with the minimum number of years of service now or hereafter required for promotion of officers of the Medical and Dental Corps to the grade in which appointed.

Sec. 202. The Secretary of War and the Secretary of the Navy are authorized to prescribe from time to time such regulations as may be necessary for the administration of this title within their respective departments.

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(Not Restricted)

Changes to be Made in Copies of Manual of the Medical Department: Certain changes in the Manual of the Medical Department have been directed as specified in Circular Letter 47-96, page 24.

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Circular Letter 47-93 23 July 1947 (Not Restricted)

To: All Activities having Optical Dispensing Units

Subj: NAVMED-1174 (Rev. 6-47), Optical Dispensing Report

This letter from the Chief of BuMed directs that the new NAVMED-1174 be used when the supply on hand of the old forms for the "Monthly Dispensing Report" has been exhausted.

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Circular Letter 47-94 23 July 1947 (Not Restricted)

To: Naval Shore Stations (as per attached list).

Subj: Contract for Care of the Dead, Fiscal Year 1948.

This letter from the Chief of BuMed to certain naval shore stations directs that when the contract for care of the dead has been awarded, the Bureau be furnished the name and address of the contractor.

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Circular Letter 47-95 24 July 1947 (Not Restricted)

To: MedOfsCom, NavHosps

Subj: Red Cross Personnel in Naval Hospitals, Survey of

1. BuMed has, during the past several months, received letters from various naval hospitals protesting reduction in Red Cross professional personnel. The national headquarters of the American Red Cross has informed this Bureau that the reduction of personnel serving at naval installations is the result of budgetary consideration affecting this and other services of the national organization in the transition of its program from war to peacetime operations.

2. The scope of services rendered in naval hospitals by the Red Cross was greatly extended during the war years. Comparative information from the various activities indicates these services have become a functional part of the administrative duties involving patients within command. It is the desire of this Bureau to present a comprehensive plan to the Red Cross enumerating the services desired in naval hospitals, thereby substantiating the necessity for provision of adequately trained personnel to carry out the projected program.

(Not Restricted)

3. Medical Officers in Command are requested to conduct a survey to ascertain the extent reduction in personnel has now, or in the future will, handicap Red Cross personnel in services required to insure that each patient derives full benefits of the local program and the overall effect such reduction in personnel will ultimately necessitate. It is further requested that an expression of opinion be made concerning the extent volunteer workers could adequately replace professional workers; the desirability of the assignment of Red Cross personnel to dependent units; the number and classification of Red Cross workers deemed essential to adequately carry out the desired program for patients, dependents, and staff personnel.

--BuMed. C. A. Swanson

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Circular Letter 47-96 29 July 1947 (Not Restricted)

To: All Holders of the Manual of the Medical Department.

Subj: Advance Change 3-1, Manual of the Medical Department

Encl: Subj Change

This letter from the Chief of BuMed directs that changes as contained in the enclosure be made in the Manual of the Medical Department. This advanced change in the manual pertains to use of the recently revised NavMed-K (Report of Dental Operations and Treatment), instructions concerning the use of which appeared in the Bumed News Letter of 18 July 1947.

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Circular Letter 47-97 30 July 1947 (Not Restricted)

To: Medical Officers in Command, Naval Hospitals

Subj: Contemplated BuMed Directive Regarding Safety Precautions in Surgical Operating Rooms Against Explosive Anesthetic Gases; Survey of Requisites for.

1. The Bureau of Medicine and Surgery contemplates the issuance of a directive that will embrace the requirements of generally accepted safe practices in surgical operating rooms in the presence of explosive gases used as anesthetic agents. This is to the end result that operating rooms under the cognizance of BuMed shall be made as safe as modern research and science can make them.

2. In formation of this directive, and prior to issuance, the following information is required by BuMed:

(Not Restricted)

(a) Is the deck in the surgical suite of the hospital under your command electrically conductive and of so-called spark-proof composition?

Generally Accepted Standards

All operating room decks, including a minimum of fifteen feet of approach deck, shall be electrically conductive and of so-called spark-proof composition. The deck may be of marble, terrazzo, or tile, with grounded brass grids of not more than four-inch squares. Special conductive-type composition linoleum, rubber, or asphalt deck covering may also be used. All types shall provide an uninterrupted low resistance path to ground. All borders of the deck shall have a continuous bonded strip well connected to the ground.

(b) If the deck in the surgical suite is not electrically conductive and of so-called spark-proof construction, what is the estimated minimum cost of installation to bring it within the standard quoted above, and what type of deck material is considered in the estimated figure?

(c) Are all electrical wiring outlets, switches and other fixtures of the explosive-proof types?

(d) What type surgical operating light is in use? (Example: Wilmot Castle #12; American Sterilizer Co., "Luminaire"; Westinghouse Co., "Scralytic"; Scaslon - Morris Co., "Operag"; Helephane Co., "Multiple Control System".)

(e) Is the surgical operating room or surgical suite completely air-conditioned?

Generally Accepted Standard

Complete air-conditioning without recirculation within the room to any other part of the hospital; including control of temperature, and humidity, with adequate volume to dilute the explosive agent. Entrance of conditioned air shall be at ceiling level and exhaust of contaminated air shall be at floor level.

(f) If the operating room or surgical suite is not completely air-conditioned, what is the estimated minimum cost of installation of a complete unit to bring it with the standard quoted above?

(g) Is all electrical equipment used in the surgical suite completely grounded?

(Not Restricted)

Generally Accepted Standard

Complete grounding of all electrical equipment, including head lamps, machine-fixed and portable, illuminating lights, instruments and appliances. This is necessary to prevent development of sparks, either static or power, which are generally conceded to be the major causes of anesthetic gas fires and explosions.

(h) If electrical equipment used in the surgical suite is not within the requirements of (g) above, what is the estimated minimum cost to bring it within the standard of (g) above?

(i) What local provision has been made as to requirements for operating room personnel to wear conductive shoes?

3. In review of currently available published material on explosions in surgical operating rooms the following is submitted:

As a result of observation, study and analysis, Barnett A. Greene, M. D., classified 230 cases of clinical investigations, involving either explosions or fires, or both, in anesthesia. The following tabulation shows the classification breakdown:

Fires and Explosions Grouped as to Etiology

1.	X-ray apparatus	10	cases
2.	Cautery apparatus	57	"
3.	Diathermy apparatus	20	"
4.	Suction-pressure machines	59	"
5.	Endoscopic apparatus	5	"
6.	High-pressure explosions	10	"
7.	STATIC ELECTRICITY	63	"
8.	Miscellaneous	6	"
	Total	230	

Item #6 may be clarified as to conditions attending mixtures of compressed gases. Under certain conditions - as when oxidizing and reducing gases are permitted to mix under high pressure, explosions due to this cause may be of terrific violence and are of a serious hazard.

In 102 cases of fire and explosions there were 484 injuries and 27 fatalities. In these cases static sparks were responsible for 34 explosions. The anesthetic agents employed were:

Ether or Ether and Oxygen
Nitrous Oxide - Oxygen and Ether
Ethylene - Oxygen
Cyclopropane - Oxygen
Ethylene - Acetylene, Acetylene-Oxygen
Oxygen
Nitrous Oxide - Ethylene

4. From a detail of 15 Anesthetic Explosions reported by 400 hospitals in 1938-1939 - from a paper by Warren P. Morrill, M. D. (Hospitals April, 1941) - static accounted for seven of the explosions using one or the other of the above listed anesthetic gases.

5. Before a combustible gaseous anesthetic can explode, even when the proper concentrations of combustibles and oxygen gases are present, a portion of the mixture must be heated to a given elevated temperature and held at that temperature long enough to cause the mixture to ignite. There is also to be considered the fact that there are four (4) essential factors required for the development of an explosion. These factors are:

(a) Combustible material: Gases, liquids, solids.

(b) Oxygen supply: Pure oxygen, normal air. nitrous oxide. mixtures of the preceding gases.

(c) Ignition sources:

Flames: Open lights, flames, burning matches, pocket lighters, gas burners.

Sparks: Static electricity, electric arcs, short circuits.

Heated Materials: Hot materials, electric heaters, glowing filaments lighted cigars and cigarettes.

(d) Distribution of oxygen in combustible materials.

Upon the basis of these factors it becomes apparent that an explosion can occur only when all four factors are in effect; and removal of one or more of these (requisite factors) eliminates the explosion hazards. In standard practice in anesthesia, factors (a), (b), and (d) are in effect most of the time. Yet explosions do not often occur because factor (c), (ignition sources), is not present at the time the other conditions are fulfilled.

6. Many surgeons and hospitals are living in a sense of false security because of various expedients which they have adopted - expedients to which they are

(Not Restricted)

quite ready to attribute their immunity from explosions so long as nothing out of the ordinary happens. Many of these expedients can be shown on physical grounds to be ineffectual and some actually likely to increase the hazard. The temporary immunity from fires and explosions is a matter of chance and is easily understood when we consider the small number of accidents of which we have knowledge that have occurred in relation to the number of gaseous anesthesias administered.

7. Comments and reference may be found in a pamphlet published by the Safety Branch, Office of Industrial Relations, Navy Department, which were reproduced from "Safety Review," Vol. 1, No. 9 and 10; Vol. 2, No. 1 and 4, and Vol. 3, No. 9. Additional facts were obtained from the U. S. Department of the Interior Technical Paper 653, "Explosive Hazards of Combustible Anesthetics."

--BuMed. C. A. Swanson

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Circular Letter 47-98 1 August 1947 (Not Restricted)

To: All Stations having Medical Department Allotment, FY 1948

Subj: Navy-wide Uniform Allotment Procedures

Refs: (a) BuMed ltr BuMed-23-CHR:tls NH/L1-1 CirLtr No. 46-155 dated 22 October 1946 to all Naval Hospitals relative to reporting of status of allotment.
(b) BuMed ltr BuMed-23-FPG:mg L1-1-1948/EN dated 7 July 1947 relative to annual estimates of expenditures, FY 1948.
(c) Navy Allotment Procedures (NAVEXOS-P-487) dated 26 June 1947.
(d) SecNav ltr dated 26 June 1947 relative to Uniform Status Allotment Reports.
(e) SecNav ltr dated 26 June 1947 relative to Accounting Data Requirements.
(f) BuSandA ltr L6-2(23)/ND(DF-331) dated 7 July 1947.
(g) BuSandA ltr L10/JO(DF-41) dated 9 July 1947.

Encls: 1. (HW) Copy of ref (c).
2. (HW) Copy of ref (d).
3. (HW) Copy of ref (e).
4. (HW) Copy of ref (f).
5. (HW) Copy of ref (g).
6. (HW) Initial Supply of "Status of Allotment Report" (NAVEXOS 2675)
7. (HW) Initial Supply of "Allotment Report for Management" (NAVEXOS 2676).

(Not Restricted)

This letter from the Deputy and Assistant Chief of BuMed cancels ref (a) and directs that the Navy Allotment Procedures as outlined in ref (c) be used for all program allotments granted by BuMed under the appropriation 1781102, Medical Department, Navy, 1948. These procedures will not apply to allotments received for fiscal years prior to 1948. NavMed Form Baker shall not be submitted for allotments granted under the appropriation 1781102, Medical Department, Navy, 1948. In accordance with ref (d) a status of allotment report is to be submitted to BuMed for each program allotment granted as authorized in ref (b). NavMed Form Baker will be used for allotments for fiscal years prior to 1948 until all obligations are liquidated. Instructions are given for initiating the essential features of the Uniform Allotment Procedures. Additional supplies of enclosures 6 and 7 are to be obtained from designated supply points. A separate letter dealing with changes in cost procedures, the submission of the NavMed Form Easy, or NavMed 569 and supporting schedules and other documents occasioned by the Navy Uniform Allotment Procedures will be promulgated in the near future.

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Circular Letter 47-99 4 August 1947 (Not Restricted)

To: Commandants Naval Districts (less 10, 15, and 17).
Potomac River Naval Command.
Attn: District Directors of Naval Reserve and District Directors of Training.

Subj: Medical Commissioning Allowance List for Training Naval Reserve Hospital Corpsmen at Armories.

Ref: (a) BuMed CirLtr No. 47-31

Encl: 1. (HW) 5 copies of subject list.

This letter from the Chief of BuMed contains instructions for the acquisition, custodial and maintenance responsibility, and use of Medical Department supplies and equipment for training Naval Reserve hospital corpsmen at armories.

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Circular Letter 47-100 4 August 1947 (Not Restricted)

To: Commandants, Naval Districts (less 10, 15, and 17).
Potomac River Naval Command.
Attn: District Directors of Naval Reserve and District Directors of Training.

Subj: Dental Commissioning Allowance List for Naval Reserve Armories.

(Not Restricted)

Encl: 1. (HW) 5 copies of subject list.

This letter from the Chief of BuMed states that the allowance as shown on the enclosure is considered adequate for one (1) dental officer to provide minimal dental examination facilities for current Naval Reserve requirements and is authorized at the discretion of addressee concerned subject to adequate space and facility requirements. Instructions are given for acquiring the listed material.

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Circular Letter 47-101 4 August 1947 (Not Restricted)

To: District Medical Officers, MedOfsCom, NavHosps.
Senior Medical Officers of Shore Stations.

Subj: Information regarding Medical Department activities of general interest to the Navy and public.

This letter from the Chief of BuMed states that it is desired that news items believed to be of general interest regarding professional work, research, medical and scientific meetings, anniversaries of the establishment of hospitals, personal items regarding either patients or the staff of medical units that might be of interest to home town papers, be forwarded to the Bureau of Medicine and Surgery to be screened for publication in conformity with existing Departmental policy. The Secretary of the Navy has stressed that informing the American public fully of the work of all units of the naval establishment is a paramount responsibility of all commanding officers.

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Circular Letter 47-102 5 August 1947 (Not Restricted)

To: All Ships and Stations

Subj: Gonorrheal Urethritis, Treatment by Pharmacist's Mates on Independent Duty.

Refs: (a) Pars. 12B6.2; 12E50; 2222; 236.3, Line 12, subpar. (b); and 5120, ManMedDept.
(b) BuMed CirLtr No. 45-127.
(c) BuMed News Letter, Vol. 8, No. 5, Page 10, Re: Masking of Early Syphilis by Penicillin Therapy in Gonorrhea.

1. Attention is invited to the above references.

(Not Restricted)

2. Cases of gonorrheal urethritis that develop on board destroyers, submarines, small craft, or at outlying stations at which the services of a medical officer cannot be obtained, may be treated with penicillin by pharmacist's mates fully qualified for independent duty. This treatment will be at the discretion of the Commanding Officer who shall be kept informed of all cases requiring treatment. Diagnosis should be as definite as possible, and pharmacist's mates on ships which have a microscope should utilize these in establishing a diagnosis. The Venereal Disease Contact Report (NAVMED-171) shall be prepared and forwarded on each case.

3. It is suggested that the treatment of these cases of gonorrhea consist of intramuscular injections of either sodium, calcium or crystalline penicillin. The recommended method of use is as follows: Dissolve 200,000 units of penicillin in 6 c.c. of physiological saline or distilled water and inject intramuscularly as follows: At zero hour administer 40,000 units (1.2 c.c.); at one hour, administer 40,000 units (1.2 c.c.); at 2 hours, 40,000 units (1.2 c.c.); and at 3 hours a final injection of 80,000 units (2.4 c.c.). If the patient fails to respond to this three-hour treatment, it is suggested that the same procedure be repeated after three days. Should this fail to effect a "cure," it is considered that the patient should be transferred at the earliest opportunity to an activity having a medical officer.

4. Pharmacist's mates should be on the alert for evidence of reaction and toxicity in the treatment of gonorrhea with penicillin and chemotherapy. Reactions from penicillin are few, but in those cases where a febrile reaction occurs, it might possibly be a Herxheimer reaction, and therefore a possibility that the patient might have coexistent syphilis, either active or latent, or in the incubation stage. All cases having a reaction should be reported to a medical officer as soon as practicable. The administration of penicillin in the treatment of gonorrhea may delay or mask the symptoms of syphilis. Therefore, all cases of gonorrhea treated with penicillin shall have monthly blood Kahns for four (4) months after treatment. If this is impossible, a blood Kahn should be taken four (4) months after treatment is completed. Should open genital lesions develop, treatment shall consist of normal saline dressings only in order to facilitate later diagnosis and avoid reactions. Proper hygienic procedures should be initiated and these cases shall be admitted to the sick list and transferred to an adequate medical facility as soon as possible.

5. Crystalline penicillin does not require refrigeration; however, once a solution is made, it deteriorates very rapidly. Due to the danger involved and the greater frequency of reactions encountered, penicillin in oil and wax shall <u>not</u> be administered by pharmacist's mates on independent duty. The following stock of penicillin is available for issue to destroyers, submarines, small craft and outlying stations having a pharmacist's mate on board who is qualified for independent duty:

(Not Restricted)

Stock Number	1-606-755	PENICILLIN, CALCIUM	200,000 Units Bot.
Stock Number	1-606-790	PENICILLIN, CRYSTALLINE	200,000 Units Bot.
Stock Number	1-606-810	PENICILLIN, SODIUM	200,000 Units Bot.

--BuMed. C. A. Swanson

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